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Remarks

Claims 1-14 are pending in the application.

Claims 14 is allowed.

Claims 1, 3-7, 9-11, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,597,841 issued to Dingel et al.

Claims 2 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,597,841 issued to Dingel et al. as applied to claims 1 and 10 above, and further in view of U.S. Patent 6,853,769 issued to McGreer.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,597,841 to Dingel et al. as applied to claim 1 above, and further in view of U.S. Patent 5,838,870 to Soref.

Each of the various rejections and objections are overcome by amendments that are made to the specification, drawing, and/or claims, as well as, or in the alternative, by various arguments that are presented.

Entry of this Amendment is proper under 37 CFR § 1.116 since the amendment: (a) places the application in condition for allowance for the reasons discussed herein; (b) does not raise any new issue requiring further search and/or consideration since the amendments amplify issues previously discussed throughout prosecution; (c) satisfies a requirement of form asserted in the previous Office Action; (d) does not present any additional claims without canceling a corresponding number of finally rejected claims; or (e) places the application in better form for appeal, should an appeal be necessary. The amendment is necessary and was not earlier presented because it is made in response to arguments raised in the final rejection. Entry of the amendment is thus respectfully requested.

Any amendments to any claim for reasons other than as expressly recited herein as being for the purpose of distinguishing such claim from known prior art are not being made with an intent to change in any way the literal scope of such claims or the range of equivalents for such claims. They are being made simply to present language that is better in conformance with the form requirements of Title 35 of the United States Code or is simply clearer and easier to understand than the originally presented language. Any amendments to any claim expressly made in order to distinguish such claim from known

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prior art are being made only with an intent to change the literal scope of such claim in the most minimal way, i.e., to just avoid the prior art in a way that leaves the claim novel and not obvious in view of the cited prior art, and no equivalent of any subject matter remaining in the claim is intended to be surrendered.

Also, since a dependent claim inherently includes the recitations of the claim or chain of claims from which it depends, it is submitted that the scope and content of any dependent claims that have been herein rewritten in independent form is exactly the same as the scope and content of those claims prior to having been rewritten in independent form. That is, although by convention such rewritten claims are labeled herein as having been "amended," it is submitted that only the format, and not the content, of these claims has been changed. This is true whether a dependent claim has been rewritten to expressly include the limitations of those claims on which it formerly depended or whether an independent claim has been rewriting to include the limitations of claims that previously depended from it. Thus, by such rewriting no equivalent of any subject matter of the original dependent claim is intended to be surrendered. If the Examiner is of a different view, he is respectfully requested to so indicate.

Rejection Under 35 U.S.C. 103(a)

Claims 1, 3-7, 9-11, and 13:

Claims 1, 3-7, 9-11, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,597,841 to Dingel et al.

Applicants' independent claim 1 (and independent claim 10) positively recites:

"An integrated polarization splitter having a passive portion and an active portion, comprising:

an arrayed waveguide grating (AWG) in the passive portion, the AWG including:

an input coupler;

an output coupler; and

a plurality of waveguides of unequal length connecting said input and output couplers;

wherein at least two output ports of said AWG are positioned relative to an input port such that a first polarization component and a second polarization

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component of a single channel input signal arriving at different phase fronts of a free space region at an output side of said AWG are respectively received by separate ones of said output ports such that said first polarization component and said second polarization component are split by said AWG; and

wherein the passive portion and the active portion are integrated in accordance with active/passive monolithic integration techniques, wherein the active portion comprises at least one active device for individually modifying at least one of said first polarization component and said second polarization component split by said AWG.

[Emphasis added.]

As taught in Applicants' invention of at least claim 1, the arrayed waveguide grating (AWG) in the passive portion of the integrated polarization splitter splits a single channel input signal to form a first polarization component and a second polarization component. Applicants' invention of at least claim 1 further teaches that the passive portion of the integrated polarization splitter is integrated with an active portion of the integrated polarization splitter in accordance with active/passive monolithic integration techniques. As such, since the active portion is integrated with the passive portion, at least one of the first polarization component in the second polarization component may be modified by at least one active device of the active portion. In other words, one or both of the split polarization components may be actively modified individually. Furthermore, it is clear from Applicants' claim 1 that the at least one of the polarization components is modified after the components are split by the AWG.

By contrast, Dingel teaches a controller coupled to an n-way optical coupler. As taught in Dingel, the controller merely controls the n-way optical coupler for controlling the splitting of an input signal. The controller taught in Dingel simply does not modify the branch signals resulting from the splitting of the input signal by the n-way optical coupler. Specifically, Dingel teaches that "[t]he n-way optical coupler may be controllable to alter the ratio of the intensities of the branch signals. Such control may be achieved using, for example, a thermo-optic or an electro-optic effect... the controller can set the intensity ratio (between the branch signals) to be a first intensity ratio, or it can set the number of resultant branch signals to be a first number (cease e.g., 2, 3, etc.)." (Dingel, Col. 4, Line 63 – Col. 5, Line 13). In other words, as taught in Dingel, the controller merely controls the passive splitting of the input signal with respect to intensity ratio or number of resultant branch signals. As such, although Dingel teaches that the splitting of the input

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signal may be controlled by a controller using an electro-optic effect, the electro-optic effect merely actuates the n-way coupler for controlling how the input signal is split (i.e., with respect to intensity ratio or number of resultant branch signals).

Since Dingel teaches actuation of an n-way coupler for controlling intensity ratio or the number of branch signals, Dingel clearly fails to teach or suggest any individual control over branch signals, much less modification of individual branch signals by at least one active device after the branch signals are split. Furthermore, as taught in Dingel, the controller is only coupled to the n-way coupler. In other words, the controller does not even have a means of accessing the resultant branch signals, much less operating as an active component for modifying the resultant branch signals. As such, the controller in Dingel simply cannot operate on the resultant branch signals after the input signal is split, much less individually modify one or both of the branch signals after the branch signals are split.

In the Office Action, the Examiner states that the Examiner agrees that Dingel does not modify branch signals resulting from the splitting of the input signal by the n-way optical controller. Since Applicants' claim 1 has been amended to clearly indicate that at least one of the first polarization component and the second polarization component that was split by the AWG may be individually modified by at least one active device, Applicants respectfully submit that Dingel fails to teach or suggest Applicants' invention as a whole.

Therefore, Applicants submit that independent claims 1 and 10 are not obvious in view of Dingel, and as such, fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder. Furthermore claims 3-7, 9-11, and 13 depend, either directly or indirectly, from independent claims 1 and 10, and recite additional limitations thereof. As such, Applicants submit that these dependent claims fully satisfy the requirements of 35 U.S.C. §103 and are patentable for at least the same reasons discussed above with respect to independent claim 1. Accordingly, Applicants respectfully request that the rejection be withdrawn.

Claims 2 and 12:

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Claims 2 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,597,841 issued to Dingel et al. as applied to claims 1 and 10 above, and further in view of U.S. Patent 6,853,769 issued to McGreer.

Each of these claims depends directly or indirectly from independent claims 1 and 10 and recites additional limitations thereof. For at least the reasons discussed above, Dingel fails to teach or suggest Applicants' invention as recited in independent claims 1 and 10, as a whole. Furthermore, McGreer fails to bridge the substantial gap as between Dingel and Applicants' invention of claim 1.

In general, McGreer discloses an arrayed waveguide grating with waveguides of unequal widths. In particular, McGreer discloses that each waveguide of the grating has a substantially uniform width, but the width of any single waveguide in the grating is selected based on a predetermined birefringence required for the waveguide.

McGreer, however, is completely devoid of any teaching or suggestion of an active portion or active device. As such, McGreer must be devoid of any teaching or suggestion of the integration of an active portion and a passive portion, much less integration of an active portion and a passive portion in accordance with active/passive monolithic integration techniques. Furthermore, McGreer must also be completely devoid of any teaching or suggestion that an active portion includes at least one active device for actively modifying at least one of a plurality of individual polarization components produced by the passive portion of the polarization splitter.

Therefore, Applicants submit that independent claims 1 and 10 are not obvious in view of Dingel and McGreer, alone or in any permissible combination, and as such, fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder. Furthermore claims 2 and 12 depend from independent claims 1 and 10 and recite additional limitations thereof. As such, Applicants submit that these dependent claims fully satisfy the requirements of 35 U.S.C. §103 and are patentable for at least the same reasons discussed above with respect to independent claims 1 and 10. Accordingly, Applicants respectfully request that the rejection be withdrawn.

Claim 8:

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Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,597,841 to Dingel et al. as applied to claim 1 above, and further in view of U.S. Patent 5,838,870 to Soref.

This claim depends from independent claim 1 and recites additional limitations thereof. For at least the reasons discussed above, Dingel fails to teach or suggest Applicants' invention as recited in independent claim 1, as a whole. Furthermore, Soref fails to bridge the substantial gap as between Dingel and Applicants' invention of claim 1.

In general, Soref discloses nanometer-scale silicon-on-insulator (SOI) photonic components. Soref discloses nanometer-scale silicon-on-insulator guided-wave optical components in the near infra-red, including a quantum well portion using intersubband or band-to-band photonic effects. In particular, Soref discloses integration of waveguides and quantum wells. Although Soref teaches the integration of many thousands of such components on a silicon chip, Soref is completely devoid of any teaching or suggestion that the active portion includes at least one active device for actively, individually modifying at least one of a plurality of polarization components produced by the passive portion. Rather, Soref specifically teaches that the waveguides simply guide the received optical signals to the multiple quantum well (MQW) portions which operate as active devices. As such, the active devices of Soref do not modify separate polarization components of an optical signal. Rather, the active devices of Soref modify un-separated optical signals. Thus, Soref fails to teach or suggest Applicants' invention of claim 1, as a whole.

Furthermore, Dingel and Soref cannot even be operably combined. As described herein, Dingel discloses an optical device for demultiplexing optical signals using an AWG. The AWG uses input and output couplers for coupling the waveguide array to input and output fibers respectively. As described herein, Soref teaches active strip-waveguide devices. Soref teaches coupling a light beam from an optical fiber into a strip-waveguide, or coupling a light beam from a strip-waveguide into an optical fiber. Since Dingel teaches a passive arrayed waveguide grating for coupling optical signals and optical fibers and Soref teaches active individual waveguides for coupling optical signals and optical fibers, the means for coupling optical signals into and out of optical fibers is

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completely different for Dingel and Soref, and since multiple such coupling means may not be employed simultaneously, Dingel and Soref simply cannot be operably combined.

Therefore, Applicants submit that independent claim 1 is not obvious in view of Dingel and Soref, alone or in any permissible combination, and as such, fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder. Furthermore claim 8 depends from independent claim 1 and recites additional limitations thereof. As such, Applicants submit that this dependent claim fully satisfies the requirements of 35 U.S.C. §103 and is patentable for at least the same reasons discussed above with respect to independent claim 1. Accordingly, Applicants respectfully request that the rejection be withdrawn.

Allowable Subject Matter

Applicants thank the Examiner for the allowance of claim 14.

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Conclusion

In view of the foregoing remarks, applicants respectfully submit that this application is in condition for allowance. Entry of this amendment, reconsideration, and allowance are respectfully solicited.


If the Examiner believes that there are any unresolved issues requiring adverse final action in any of the claims now pending in the application, it is requested that the Examiner contact Michael Bentley at 732-383-1434 or Eamon J. Wall at 732-530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

In the event that an extension of time is required for this amendment to be considered timely, and a petition therefor does not otherwise accompany this amendment, any necessary extension of time is hereby petitioned for, and the Commissioner is authorized to charge the appropriate cost of such petition to counsel's Deposit Account No. 20-0782/LCNT/126251.

Respectfully submitted,

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